

We claim:

1. A method for removing organic contaminants from a substrate comprising the steps:
holding said substrate in tank; and
filling said tank with a gas mixture comprising water vapor, ozone and an additive acting as a scavenger.
2. A method as recited in claim 1, further comprising the step of adding oxygen or nitrogen or argon to said mixture.
3. A method as recited in claim 1, wherein the organic contaminant is a confined layer covering at least part of said substrate.
4. A method as recited in claim 3, wherein said confined layer has a thickness in the range of submonolayer coverage and $1\mu\text{m}$.
5. A method according to claim 1, wherein said gas mixture is in contact with said substrate.
6. A method as recited in claim 1, wherein said additive is acting as OH radical scavenger.
7. A method as recited in claim 1, wherein said additive is comprised of one of the following: a carboxylic acid, a phosphonic acid, or salts thereof.
8. A method as recited in claim 7, wherein said additive is acetic acid.
9. A method according to claim 1, wherein the proportion of said additive in said gas mixture is less than 10% molar weight of said gas mixture.
10. A method according to claim 9, wherein the proportion of said additive in said gas mixture is less than 1% molar weight of said mixture.
11. A method according to claim 10, wherein the

proportion of said additive in said gas mixture is less than 0.5% molar weight of said gas mixture.

12. A method according to claim 11, wherein the proportion of said additive in said gas mixture is less than 0.1% molar weight of said gas mixture.

13. A method according to claim 1, further comprising the step of rinsing said substrate with a solution.

14. A method as recited in claim 13, wherein the rinsing solution comprises de-ionised water.

15. A method as recited in claim 14, wherein said solution further comprises one of the following: HCl, HF, HNO₃, CO₂ or O₃.

16. A method as recited in claim 14, wherein said solution is subjected to megasonic agitation.

17. A method as recited in claim 1, further comprising the steps of:

filling said tank with a liquid comprising water and said additive, the liquid level in said tank remaining below said substrate, and

heating said liquid.

18. A method as recited in claim 17, wherein the filling of said tank is with ozone.

19. A method as recited in claim 18, wherein the ozone is bubbled through the liquid.

20. A method as recited in claim 17, wherein the temperature of said liquid is between 16°C and 99°C.

21. A method as recited in claim 20, wherein the temperature of said liquid is between 20°C and 90°C.

22. A method as recited in claim 21, wherein the temperature of said liquid is between 60°C and 80°C.

23. A method as recited in claim 1, wherein the water vapor is a saturated water vapor.

24. A method as recited in claim 1, wherein the

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25. A method as recited in claim 1, wherein the temperature of said mixture is below 150°C but higher than the temperature of said substrate.

~~27.1~~ A method for removing organic contaminants from a substrate, comprising the steps of:

maintaining said liquid at a temperature less than the boiling point of said liquid.

~~29. A method as recited in claim 27, wherein a liquid is sprayed over said substrate.~~

~~31.~~ A method according as recited in claim ~~30~~,
wherein the temperature of said liquid is between 20°C and
90°C.

6 ~~32~~. A method according as recited in claim ~~31~~,
25 wherein the temperature of said liquid is between 60°C and
80°C.

133. A method as recited in claim 21, wherein said liquid is subjected to megasonic agitation.

~~34.~~ A method as recited in claim ~~27~~, wherein the
30 ozone is bubbled through the liquid.

~~935.~~ A method as recited in claim ~~27~~¹, wherein the organic contamination is a confined layer covering at least part of said substrate.

10 ~~36.~~ A method as recited in claim ~~35~~⁹, wherein said confined layer has a thickness in a range of submonolayer coverage and 1 μm .

11 ~~37.~~ A method as recited in claim ~~27~~¹, wherein said additive is acting as OH radical scavenger.

Subale > ~~38.~~ A method as recited in claim 27, said additive is comprised of one of the following: a carboxylic acid, a phosphonic acid or salts thereof.

13 ~~39.~~ A method as recited in claim ~~38~~¹², wherein said additive is acetic acid.

40. A method according to claim 27, wherein the proportion of said additive in said liquid is less than 1% molar weight of said liquid.

41. A method according to claim 40, wherein the proportion of said additive in said liquid is less than 0.5% molar weight of said liquid.

15 ~~42.~~ A method according to claim ~~41~~¹⁴, wherein the proportion of said additive in said liquid is less than 0.1% molar weight of said liquid.

Sub D2 20 43. A method as recited in claim 27, wherein the ozone bubbles are contacting said organic contaminants.

17 ~~44.~~ A method as recited in claim ~~27~~¹, further comprising the step of rinsing said substrate with a solution.

25 ~~45.~~ A method as recited in claim ~~44~~¹⁷, wherein said solution comprises de-ionised water.

Sub A7 > ~~46.~~ A method as recited in claim 45, wherein said solution further comprises one of the following: HCl, HF, HNO₃, CO₂ or O₃.

30 ~~47.~~ A method as recited in claim ~~44~~¹⁷, wherein said solution is subjected to megasonic agitation.

21 ~~48.~~ A method as recited in claim ~~27~~¹, wherein said substrate is a silicon wafer.

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22 ~~48.~~

A method for removing organic contaminants from a substrate comprising the steps of:

holding said substrate in tank; and

5 filling said tank with a fluid comprising water, ozone and an additive acting as a scavenger, and wherein the proportion of said additive in said fluid is less than 1% molar weight of said fluid.

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